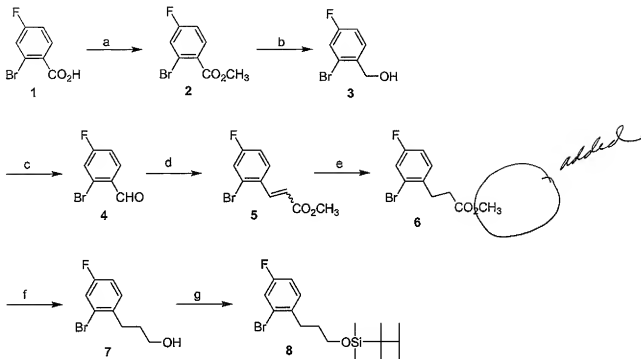
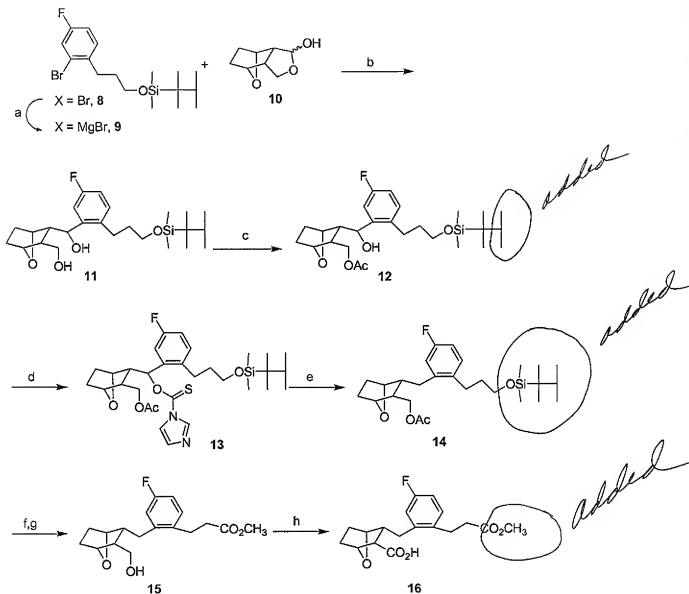


FIGURE 1



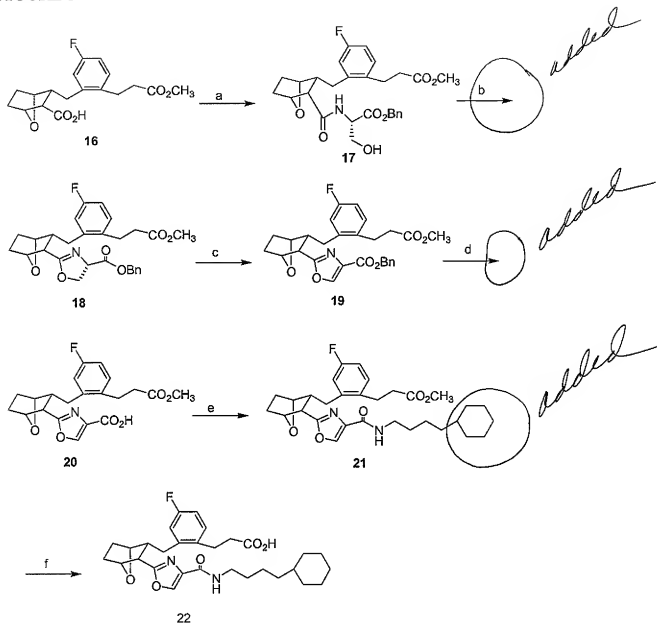
(a) CH<sub>3</sub>I, DBU, acetone; (b) DIBAL, toluene -78 °C to rt; (c) PDC, MgSO<sub>4</sub>, 4Å molecular sieves, CH<sub>2</sub>Cl<sub>2</sub> 74% from 1; (d) Ph<sub>3</sub>PCHCO<sub>2</sub>CH<sub>3</sub>, toluene 95%; (e) (Ph<sub>3</sub>P)<sub>3</sub>RhCl, H<sub>2</sub>, EtOH 80%; (f) DIBAL, toluene -78 °C to rt 99%; (g) Dimethylthexylsilyl chloride, DMAP, Et<sub>3</sub>N, CH<sub>2</sub>Cl<sub>2</sub> 83%.

FIGURE 2



(a) Mg, THF, 65 °C; (b) EtMgBr, 0 °C to rt 69%; (c) Ac<sub>2</sub>O, pyridine 77%; (d) (Im)<sub>2</sub>S, ClCH<sub>2</sub>CH<sub>2</sub>Cl, 60 °C 94%; (e) *n*-Bu<sub>3</sub>SnH, AIBN, toluene, 110 °C 84%; (f) CrO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, acetone; (g) MeOH, AcCl 88% for 2 steps; (h) CrO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, acetone.

FIGURE 3



(a) L-serine benzyl ester hydrochloride, DCC, HOBT, Et<sub>3</sub>N, THF 80% for 2 steps;  
 (b) PPh<sub>3</sub>, CCl<sub>4</sub>, *i*-Pr<sub>2</sub>NEt, CH<sub>3</sub>CN 69%; (c) BrCCl<sub>3</sub>, DBU, CH<sub>2</sub>Cl<sub>2</sub> 0 °C 75%; (d) H<sub>2</sub>, Pd(OH)<sub>2</sub>/C,  
 EtOAc 100%; (e) i. (COCl)<sub>2</sub>, cat. DMF, CH<sub>2</sub>Cl<sub>2</sub>; ii. 4-cyclohexylbutylammonium chloride,  
 Et<sub>3</sub>N, CH<sub>2</sub>Cl<sub>2</sub> 78%; (f) NaOH, aqueous THF, 95%.

FIGURE 4

